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RESEARCH ARTICLE

First record of *Lycoperdina succincta* (Linnaeus, 1767) (Coleoptera, Endomychidae) from Kazakhstan

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Abstract

Handsome fungus beetle *Lycoperdina succincta* (Linnaeus, 1767) from the family Endomychidae is the first recorded from Kazakhstan (North Kazakhstan, Akmola, and North Kazakhstan regions and South-East Kazakhstan, Almaty region). The finds of L. succincta from the Almaty region of Kazakhstan are currently the southernmost localities for this species and a new record for Central Asia. *Coprinus comatus* (O.F. Müller) Persoon, 1797, *Tulostoma volvulatum* I.G. Borshchov, 1865, *Bovistella utriformis* (Bulliard) Demoulin & Rebriev, 2017 and *Tricholoma terreum* (Schaeffer) P. Kummer, 1871 for *L. succincta* were recorded from Lazakhstan also. A key to determining the known genera and species of Endomychidae from Kazakhstan is given.

Keywords

Lycoperdina succincta, handsome fungus beetles, new record, Central Asia

Introduction

In total, 130 genera and 1800 species of the handsome fungus beetles Endomychidae are known from the world fauna (Ślipiński, Leschen and Lawrence 2011), and about 9 genera and more than 30 species from the former USSR (Lafer 1992). Two genera and three species, *Dapsa horvathi* Csiki, 1901, *Dapsa trimaculata* Mot-

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schulsky, 1835, and *Mycetina cruciata* Schaller, 1783 were known from Kazakhstan (Tomaszewska, Rücker and Löbl 2007; Shockley et al. 2009; Temreshev 2017). Most of the species are associated with various fungi, raincoats, tree fungi, tinder fungi, mold, etc. Several adults and larvae are carnivorous, feeding on armored scale insects and herbivorous mites. Some representatives are pests of stocks and / or invasive species (Lafer 1992; Mordkovich and Sokolov 1999; Tomaszewska 2000; Robinson 2005; Drake 2009; Hagstrum and Subramanyam 2009; Shockley et al. 2009; Denux and Zagatti 2010; Roques et al. 2010; Temreshev 2017; Endomychidae in GBIF Secretariat 2021).

The genus *Lycoperdina* includes 18 described species (*Lycoperdina* Latreille, 1807 in GBIF Secretariat 2021). In total, 28 species (18 from the Palearctic, nine from the Ethiopian, and one from the Nearctic Regions) belong to this genus (Shockley et al. 2009). They live in open places with rare vegetation. Beetles usually overwinter in mushrooms, in a spore mass. The larvae and pupae develop in mushrooms family Agaricaceae, species of the genus *Lycoperdon* P. Micheli, 1729, *Bovista* Persoon, 1794, *Handkea* Kreisel, 1989, *Calvatia* (Fries, 1849), *Mycenastrum* (Desvaux, 1842), *Tulostoma* Persoon, 1794 and *Agaricus* Linnaeus, 1753 (Kryzhanovsky 1965; Lafer 1992; Nikitsky et al 1996; Tomaszewska 2000; Wojas 2016; Lund 2017). Also among the host mushrooms is indicated species from family Geastraceae, collared earthstar *Geastrum triplex* Junghuhn, 1840 (Green 1997; Wojas 2016) and reported this beetles from fungi in the family Hydnaceae, Pezizaceae, and Pluteaceae (Shockley et al 2009). Specimens of *L. ferruginea* J.E. LeConte, 1824 have also been collected from forest litter or debris (Pakaluk 1984). Species of genus *Lycoperdina* have not been previously recorded in Kazakhstan (Tomaszewska, Rücker and Löbl 2007; Shockley, Tomaszewska and McHugh 2009).

Material and methods

The material was collected by manual method. Studied specimens are kept in the private collection I.I. Temreshev (Almaty, Kazakhstan). The materials of V.A. Glushen (vill. Zerenda, Kazakhstan) from North Kazakhstan and Akmola regions were studies also. Standard techniques (Fasulati 1971) used in entomology were used during the collection of the material. The following sources (Jacobson 1905-1915; Kryzhanovsky 1965; Strohecker 1970; Friese 1971; Lafer 1992; Nikitsky et al 1996; Krasutsky 1996; 2005; 2007; Tomaszewska, Rücker and Löbl 2007; Guéorguiev and Ljubomirov 2009; Muller, Jarzabek-Muller and Bussler 2013; Lund 2017; *Lycoperdina succincta* (Linnaeus, 1767) in GBIF Secretariat 2021; Munteanu-Molotievskiy, Moldovan and Toderas 2021) were used for species determination of the beetles, clarification of their taxonomic position, biology and the distribution.

Photographs of *L. succincta* (Figs 1, 2) were taken with a camera Canon EOS 50 D by author. Photographs of the mushrooms (Figs. 4) were taken with a camera

Redmi 7 by I.I. Temreshev also. Descriptions and body measuring was performed using a Micromed MC var 1-C dissecting stereomicroscope.

The mushrooms, that *L. succincta* was collected, were determined using special literature (Samgina 1981; 1985) and the materials from the site "Mushrooms of Kazakhstan" ("Mushroom classification", n.d.).

Results

***Lycoperdina succincta* (Linnaeus, 1767)**
Figures 1–2

Material examined. 1 female, North Kazakhstan, Akmola region, Akkol district, Azat village, N 52°5'14.35" E 71°31'23.85", *Lycoperdon molle* Persoon, 1801 and *Bovistella utriformis* (Bulliard) Demoulin & Rebriev, 2017, 5.07.2018, I.I. Temreshev; 1 female, 1 male, North Kazakhstan, Akmola region, Zerendinsky district, Zerenda village, N 52°53'29.65" E 69°9'18.38", *Tricholoma terreum* (Schaeffer) P. Kummer, 1871, V.A. Glushen; 1 male, North Kazakhstan, North Kazakhstan region, Ayyrtau district, Imantau village, N 52°57'48.22" E 68°20'15.87", under coastal sediments, 21.05.2019, V.A. Glushen; 1 female, South-Easth Kazakhstan, Almaty region, Talgar district, Arkabay village, 43°24'51.58" E 77°6'8.82", 25.05.2020, *Tulostoma volvulatum* I.G. Borshchov, 1865, I.I. Temreshev; 1 male, North Kazakhstan, Akmola region, Nur-Sultan city, N 51°7'8.64" E 71°21'9.57", *Coprinus comatus* (O.F. Muller) Persoon, 1797, 15.09.2020, I.I. Temreshev.

Figure 1. *Lycoperdina succincta*, male, habitus, dorsal view. South-East Kazakhstan.

Figure 2. *Lycoperdina succincta*, male, aedeagus, laterally. South-East Kazakhstan.

Discussion

The records of *Lycoperdina succincta* are absent for Kazakhstan (Tomaszewska, Rücker and Löbl 2007; Shockley et al. 2009).

Lycoperdina succincta is distributed (Fig. 3) in Europe: Austria, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Georgia, Germany, Great Britain, Greece, Hungary, Italy, Latvia, Lithuania, Macedonia, Moldova, Netherlands, Norway, Poland, Romania, Russia, Sardinia and Korsica Island, Slovakia, Slovenia, Spain, Sweden, Switzerland, Ukraine. Asia: Siberia, Mongolia (Jacobson 1905-1915; Strohecker 1970; Friese 1971; Lafer 1992; Tomaszewska, Rücker and Löbl 2007; Guéorguiev and Ljubomirov 2009; Müller, Jarzabek-Müller and Bussler 2013; Lund 2017; *Lycoperdina succincta* (Linnaeus, 1767) in GBIF Secretariat 2021; Munteanu-Molotievskiy, Moldovan and Toderas 2021).

The localities for this species from Kazakhstan (North Kazakhstan, Akmola and Almaty regions, Fig. 4) are quite far from each other.

It is possible that the species was accidentally introduced to the Almaty region from the north of Kazakhstan with planting material of the plants or the products, like some other species of Coleoptera (Temreshev and Makezhanov 2019, Temreshev and Kazenas 2020). The records of *L. succincta* from the Almaty region of Kazakhstan are currently the southernmost points for this species and the new record for Central Asia.

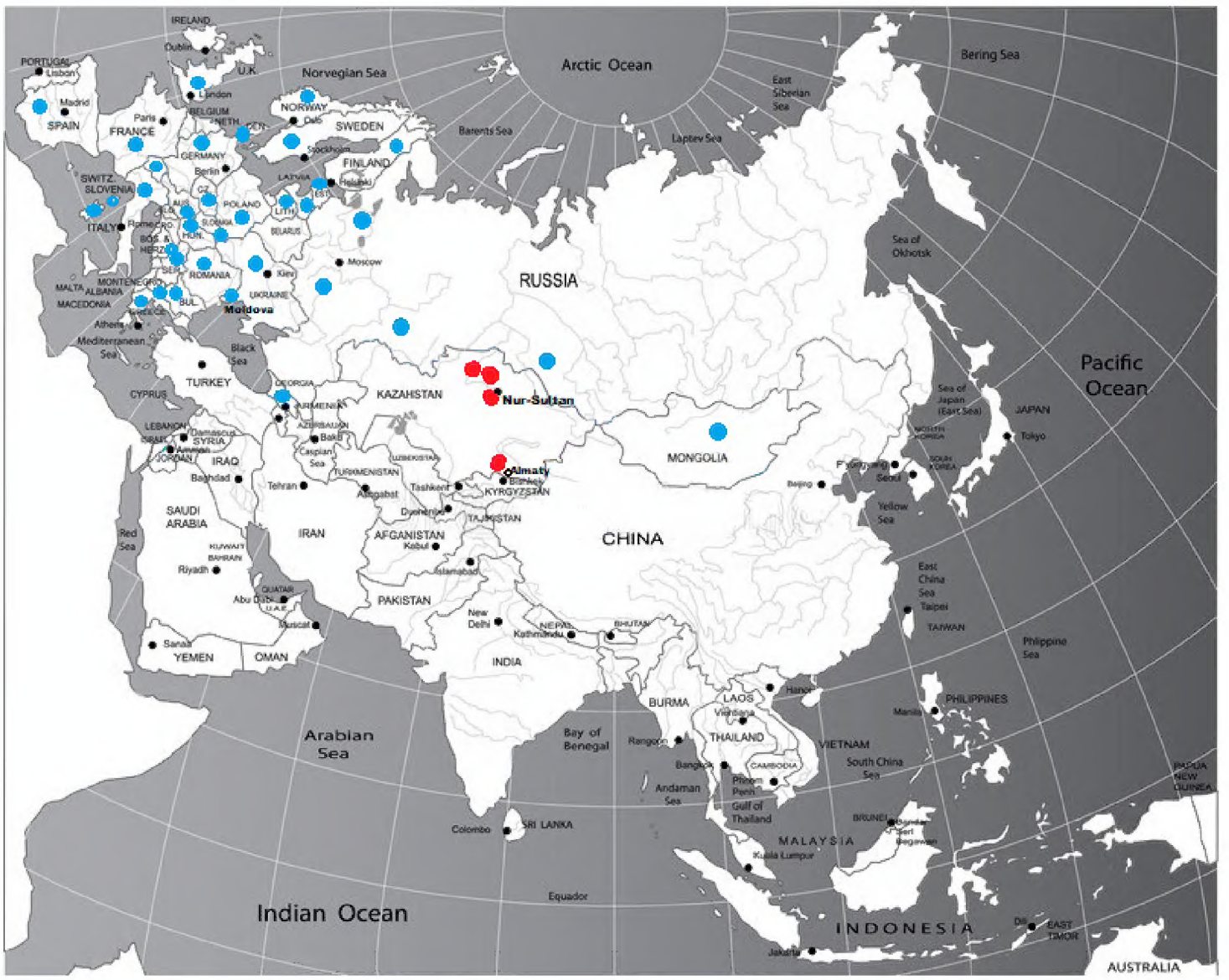

Figure 3. Distribution of *Lycoperdina succincta* in world. New records are indicated with red circles. Known indicated in blue circles.

Figure 4. Distribution of *Lycoperdina succincta* in Kazakhstan. Red circle – points of records.

The larvae of this species feed on Puffballs mushrooms - species of the genus *Lycoperdon* Persoon, 1794 and *Bovista nigrescens* Persoon, 1794 according to the literature data (Kryzhanovsky 1965; Lafer 1992; Nikitsky et al 1996) and champignons *Agaricus* (Kryzhanovsky 1965). There are the first records of *Lycoperdina succincta* on *Coprinus comatus* (O.F. Muller) Persoon, 1797, *Tulostoma volvulatum* I.G. Borshchov, 1865, *Bovistella utriformis* (Bulliard) Demoulin & Rebriev, 2017 (Agaricaceae) and *Tricholoma terreum* (Schaeffer) P. Kummer, 1871 (Tricholomaceae) (Fig. 5).

In total three genera and four species of the Endomychidae are recorded from Kazakhstan.

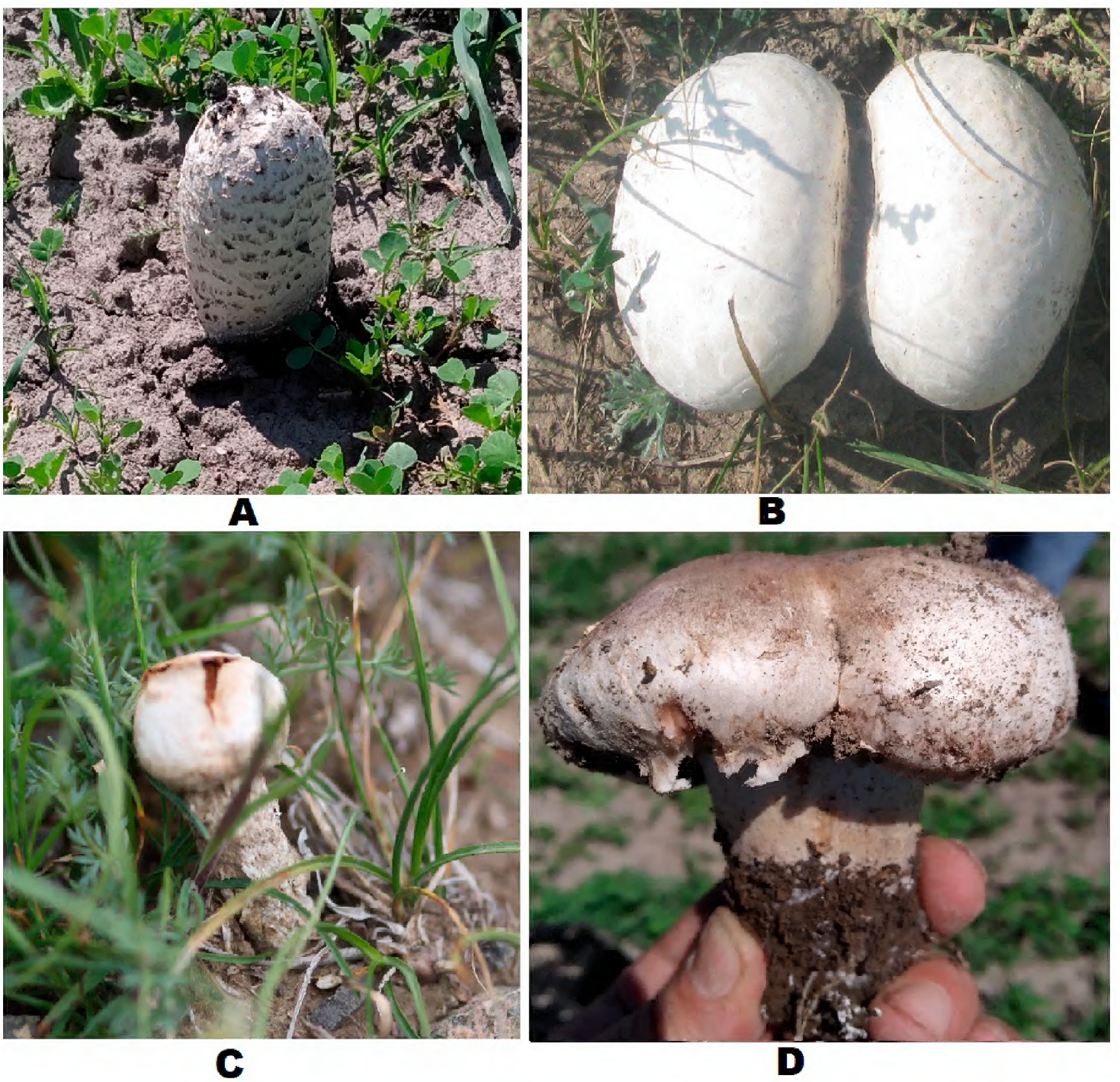

Figure 5. Mushrooms species whith *Lycoperdina succincta*: A – *Coprinus comatus*; B – *Bovistella utriformis*; C – *Tulostoma volvulatum*; D – *Tricholoma terreum*.

Key to known genera and species of handsome fungus beetles of Kazakhstan

1 Body dorsally tomentose. Pronotum with major depressions laterally, edged between them. Elytra without punctate striae. Scutellum transverse, punctate. Body yellow-brown, with dark spots on elytra, pubescent ....***Dapsa*** **Latreille, 1829**.....**2**

– Body dorsally glabrous, shiny. Pronotum weakly transverse, slightly narrowed towards base. Scutellum semicircular, smooth. Procoxae contiguous. Clypeus separated from the forehead by a distinct groove..... .....***Lycoperdina*** **Latreille, 1807**.....**3**

– Procoxae separated by a prosternal process. Pronotum not narrowed towards base. Clypeus not separated from forehead by groove..... .....***Mycetina*** **Mulsant, 1846**.....**4**

2 Anterior angles of the pronotum are simple, not hook-shaped. Pronotum semicircular anteriorly, gradually tapering from middle. Brownish yellow, slightly shiny, with dense punctures, covered with adjoining hairs. Elytra behind middle with black band, which usually divides into 3 spots ....***Dapsa trimaculata*** **Motschulsky, 1835**

– Anterior angles of the pronotum slightly curved, with a very small hook, directed to sides. Pronotum nearly rectangular, with a small projection in the middle. Coloring similar to previous species, but sometimes specimens completely yellow with reduced pattern on elytra ....***Dapsa horvathi*** **Csiki, 1901**

3 Body elongated, rusty-red. Elytra with a wide black band, sometimes occupying their entire area or interrupted along suture ....***Lycoperdina succincta*** **(Linnaeus, 1767)**

4 Body short-oval, shiny, red. Elytra with cross-shaped black pattern ....***Mycetina cruciata*** **Schaller, 1783**

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